

AIRCRAFT NOISE EXPOSURE AND COGNITIVE PERFORMANCE IN CHILDREN LIVING NEAR THE CIAMPINO AIRPORT IN ROME

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Background and Aims: chronic aircraft noise exposure has been associated with impairment of reading comprehension and long-term memory in the RANCH study. We evaluated the association between aircraft noise exposure and cognitive performance in children living around the Ciampino airport in Rome, Italy.

Methods: we investigated 555 children, aged 9-11 years, attending 13 schools located in the airport area. Aircraft noise L_{eq} levels were measured for each school from 9.00 am to 1.00 pm. To estimate aircraft noise exposure at home, we defined three contours ($L_{aeq,24h}$ <60, 60-65, and >65-75 dB) using the Integrated Noise Model linked to each participant's address (a GIS system was employed). Children completed classroom-based tests on cognition, reading comprehension, recognition and cued recall, working memory, sustained attention, and auditory discrimination. Questionnaires were completed by parents to provide information about children's health status and socioeconomic context. The effects of airport noise on specific cognitive performance were analysed through adjusted logistic regression models (outcome variables: lowest decile of the distribution for each test) considering school clustering.

Results: in our sample, 40% of children was exposed at school at >65-75 dB, while 4.3% lived in homes exposed at >65-75dB. We found an association between aircraft noise levels at school and auditory discrimination ability (OR 1.7, 95% CI 0.9-3.1 when comparing >65-75 vs <60 dB), this impairment became statistically significant when children cognition was taken into account (OR 1.9, 95%CI 1.1-3.5). When we considered exposure at home, we found a borderline excess risk for impairment in cognition (OR 2.97, 95%CI 0.95-9.28) and a strong effect for auditory discrimination ability (OR 3.4, 95%CI 1.1-10.7). No association was found between exposure to aircraft noise and the other tests performed.

Conclusions: our findings indicate that chronic aircraft noise exposure plays a role in the cognitive development of children.